Submitted by
David Williams
IAET

To: Michigan Senate Regulatory Reform Committee

From: Michael A. Anthony P.E.

Date: 9/27/2012

Re: House Bill 4561 – Support for 3-year *National Electrical Code* Adoption Cycle

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The State of Michigan can neither keep up with the gathering pace of innovation in electro-technology, nor hope to lead in innovation by slowing down national technical standards adoption. Therefore I support the continuation of the present 3-year adoption of the National Electrical Code (NEC) and urge that wherever the NEC is referenced in the body of standards that govern electrotechnology in the state of Michigan that the practical effect of those references preserves the national 3-year revision cycle. I write from the point of view as a registered professional electrical professional who has practiced in the State of Michigan for 30 years and who now serves on standards-setting committees including the NEC and committees now working under the auspices of the Geneva-based *International Electrotechnical Commission(IEC).*

I am sympathetic to legislators eager to "de-regulate"; to confront the cost of value-delivery that is very expensive relative to available resources. Alternative energy source development, market drivers for energy efficient end-use apparatus such as LED lighting, "green" heating and cooling equipment and other "sustainability" initiatives are at the top of state agendas everywhere. In the highly networked electrotechnology industry, which depends upon many interdependent best-practice documents working together however, lengthening the adoption cycle of the mother standard to every 6 years will complicate nearly everything. More work will be required of electrical and telecommunication professionals to determine if underlying references to product conformity standards in older versions of the NEC are accurate, applicable, or even safe.

Codes and standards are always in-progress, "living documents" that, by necessity, do not develop in step with each other, much as we would like them to. They are complex and fast-moving; made even more complicated by gaps in local authority, overlapping jurisdictions, or both. The committee may be interested to know that many standards – such as those by *Underwriters Laboratories*, the *American Society for Testing and Materials*, the *Telecommunications Industry Association*, the *American Society of Mechanical Engineers*, the *American Gas Association* and the *American Society of Heating and Refrigeration Engineers* -- can change as quickly as ***every 45 days***. (Attachment #1)

National Standards Perspective

All nations use the standards development process to secure and hasten strategic technological advantage for its industries. Recognizing that any industry will gravitate to the most cost-effective standardization structures, the U.S. federal government's *National Technology Transfer and Advancement Act (NTTAA)* was signed into law in 1995. It is administered by the National Institute of Science and Technology (NIST) and reports to the Secretary of Commerce. The NTTAA promotes the development of new standards by requiring that all federal agencies use privately developed standards before they promulgate industry standards themselves. In an open memorandum originating from the Office of Science and Technology dated January 17, 2012, and directed to federal agencies with oversight of industries of strategic importance, stakeholders were reminded of the limits of the NTTTA:

> *"... In limited policy areas, however, where a national priority has been identified in statute, regulation, or Administration policy, active engagement or a convening role by the Federal Government may be needed to accelerate standards development and implementation to help spur technological advances and broaden technology adoption." Attachment #2)*

In other words, if the Executive Offices of the President (the so-called "technology czars") are not satisfied with the pace or the direction that privately-developed consensus documents are taking, it may aggressively "convene" in an industry's response to market forces. By slowing the NEC adoption cycle, the State of Michigan may encourage federal involvement in Michigan's building and manufacturing industries in a manner that may not be to the liking of Michigan businesses. Branches of the federal government that promote a "green" agenda may violate notions of cost effectiveness and capital efficiency that have

informed assumptions about energy conservation for decades. Thus, more federal involvement could work at cross-purposes for state de-regulation initiatives such as HB 4561.

International Standards Perspective

Unlike many of the building codes that govern leading practice for architecturally-designed facilities fixed in place, the US National Electrical Code is a world document. In addition to its use in all 50 states, countries that have formally adopted the NEC include Mexico, Costa Rica, Venezuela and Columbia. Many countries in South America use the NEC, and it has been translated into Spanish, Korean and Japanese. Unlike the other electrotechnology world document -- *IEC 60364: Electrical Installations for Buildings*– which only provides the authority with guidance on developing individual national wiring rules; the NEC is recognized as ready for use as enforceable "code" in building wiring systems, in products (such as packaged heating and cooling equipment), in industrial control equipment (such as equipment used in automated manufacturing processes); and in data centers; to name a few. Michigan's manufacturers have long embraced IEC products in their manufacturing plants because of their exposure to world markets.

Thus, the use of the current edition of the NEC is important in global trade. Large equipment such as power switchgear, generators, and transformers are made from materials and parts all over the world. These parts may only meet each other at Michigan job sites or the shop floor for the first time and they may not all speak the same language. So-called *global value chains* fragment production and vertical specialization in international trade. Trade in "intermediate goods" (i.e. a material or sub-assembly) must cross many borders to become part of one final, finished product. According to the World Trade Organization the import content of exported goods is 40% -- double the level from twenty years ago -- and might be 60% twenty years from now. Thus, states like Michigan need to import in order to be able to export.

Taking full advantage of the opportunities presented by global value chains and international trade at large requires the Michigan products be governed by the latest thinking that is driven into the NEC every 3 years. We want Michigan businesses involved in electrotechnology to be governed by the highest developed stage of technical capability

regarding products, processes and services, based on the relevant consolidated findings of science, technology and experience. Every update of the NEC provides Michigan businesses with:

- A framework for economies of design and production endorsed and certified quality of products, and better interoperability with world customers; thus allowing for Michigan goods to remain export competitive.
- A level playing field. When Michigan businesses are able to meet the safety and environmental standards on electrotechnology required by a global market it makes its products more attractive to wholesale buyers and consumers.
- A reference document to combat protectionist measures. This is particularly crucial as economies worldwide struggle with persisting financial crisis. Because most of the documents that are referenced into the NEC are developed according to the American national standards process, its users may enjoy trade protection mechanism built into world trade treaties.

Economic growth is driven by the creation of new and better ways of producing goods and delivering services; a process that triggers new and productive investments. But it only happens when the latest standards are used to accelerate development, hasten advances, and broaden adoption. In the recent collapse of the solar and wind power industry we have already seen the results of national agendas set because the federal government felt that the industries were not moving fast enough. When industries do not move fast enough to meet national technology strategy political agendas intervene. *These agendas are not always informed by the best science, engineering and economics.* Wicked and complex as the standards-development, adoption and conformity process is, it should not be made slower by HB 4561. If anything, Michigan should be moving faster.

Michael A. Anthony, P.E.

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American National Standards Maintained Under Continuous Maintenance

The ANSI Essential Requirements: Due Process Requirements for American National Standards provide two options for the maintenance of American National Standards (ANS): periodic maintenance (see clause 4.7.1) and continuous maintenance (see clause 4.7.2). Continuous maintenance is defined as follows:

The standard shall be maintained by an accredited standards developer. A documented program for periodic publication of revisions shall be established by the standards developer. Processing of these revisions shall be in accordance with these procedures. The published standard shall include a clear statement of the intent to consider requests for change and information on the submittal of such requests. Procedures shall be established for timely, documented consensus action on each request for change and no portion of the standard shall be excluded from the revision process. In the event that no revisions are issued for a period of four years, action to reaffirm or withdraw the standard shall be taken in accordance with the procedures contained in the ANSI Essential Requirements.

The Executive Standards Council (ExSC) has determined that for standards maintained under the Continuous Maintenance option, separate PINS announcements are not required. The following ANSI Accredited Standards Developers have formally registered standards under the Continuous Maintenance option.

- AAMI (Association for the Advancement of Medical Instrumentation)
- AAMVA (American Association of Motor Vehicle Administrators)
- AGA (American Gas Association)
- AGRSS, Inc. (Automotive Glass Replacement Safety Standards Committee, Inc.)
- ASC X9 (Accredited Standards Committee X9, Incorporated)
- ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.)
- ASME (American Society of Mechanical Engineers)
- ASTM (ASTM International)
- GEIA (Greenguard Environmental Institute)
- HL7 (Health Level Seven)
- MHI (ASC MH10) (Material Handling Industry)
- NAHBRC (NAHB Research Center, Inc.)
- NBBPVI (National Board of Boiler and Pressure Vessel Inspectors)
- NCPDP (National Council for Prescription Drug Programs)
- NISO (National Information Standards Organization)
- NSF (NSF International)
- TIA (Telecommunications Industry Association)
- UL (Underwriters Laboratories, Inc.)

To obtain additional information with regard to these standards, such as contact information at the ANSI accredited standards developer, please visit ANSI Online at www.ansi.org, select Internet Resources, click on "Standards Information," and see "American National Standards Maintained Under Continuous Maintenance". This information is also available directly at www.ansi.org/publicreview.

Alternatively, you may contact the Procedures & Standards Administration Department (PSA) at psa@ansi.org or via fax at 212-840-2298. If you request that information be provided via E-mail, please include your E-mail address; if you request that information be provided via fax, please include your fax number. Thank you.

HB 4561 - Attachment #1
(Anthony letter)

Executive Office of the President
Office of Management and Budget

Executive Office of the President
United States Trade Representative

Executive Office of the President
Office of Science and Technology Policy

January 17, 2012

HB 4561 Attachment #2
(Anthony letter)

M-12-08

MEMORANDUM FOR THE HEADS OF EXECUTIVE DEPARTMENTS AND AGENCIES

FROM: Aneesh Chopra
U.S. Chief Technology Officer
Office of Science and Technology Policy

Miriam Sapiro
Deputy
United States Trade Representative

Cass R. Sunstein
Administrator, Office of Information and Regulatory Affairs
Office of Management and Budget

SUBJECT: Principles for Federal Engagement in Standards Activities to Address National Priorities

On February 4, 2011, the President released *"A Strategy for American Innovation: Securing Our Economic Growth and Prosperity"*[1] and directed Federal agencies to increase their efforts to catalyze technology breakthroughs to advance national priorities. Pursuant to the *Strategy for American Innovation*, the Office of Science and Technology Policy (OSTP), the Office of Management and Budget (OMB), and the Office of the United States Trade Representative (USTR) are issuing this Memorandum to clarify principles guiding Federal Government engagement in standards activities[2] that can help address national priorities.

The vibrancy and effectiveness of the U.S. standards system in enabling innovation depend on continued private sector leadership and engagement. Most standards developed and used in U.S markets are created with little or no government involvement. This approach – reliance on private sector leadership, supplemented by Federal Government contributions to discrete standardization processes as outlined in OMB Circular A-119, "Federal Participation in the Development and Use of Voluntary Consensus Standards and in Conformity Assessment Activities"[3] – remains the primary strategy for government

[1] http://www.whitehouse.gov/innovation/strategy.
[2] http://www.whitehouse.gov/omb/circulars_a119/.
[3] http://www.whitehouse.gov/omb/circulars_a119/.

engagement in standards development. Consistent with the Administration's commitment to openness, transparency, and multi-stakeholder engagement, all standards activities should involve the private sector.

In limited policy areas, however, where a national priority has been identified in statute, regulation, or Administration policy, active engagement or a convening role by the Federal Government may be needed to accelerate standards development and implementation to help spur technological advances and broaden technology adoption. In these instances, the Federal Government can help catalyze advances, promote market-based innovation, and encourage more competitive market outcomes. The Federal Government should clearly define its role, and then work with private sector standardization organizations in the exercise of that role.

For example, the *Strategy for American Innovation* describes national priorities with respect to achieving breakthroughs in health care technology and promoting clean energy. In both of these areas, the Federal Government is making substantial technology investments – electronic health record systems and smart grid technologies – to produce productivity gains and improve outcomes. And in both of these technology markets, interoperability standards are needed to decrease the risk that sizable public and private investments will become obsolete prematurely. To accomplish these objectives, the Federal Government, as directed by Congress, is taking a convening role to accelerate standards development, by working closely with domestic and international private sector standards organizations.

The principles and related directions to agencies outlined in this Memorandum are intended to be followed in those limited instances in which the Federal Government engages in a convening or active engagement role together with private sector standardization organizations to address a national priority. Such engagement should be undertaken pursuant to existing legal and policy obligations.

Federal Government Objectives for Standards Engagement to Address National Priorities

Once a national priority has been identified, it is important for the Federal Government to engage private sector stakeholders early in the process of identifying technology, regulatory, and/or procurement objectives. The Federal Government's engagement should be broad-based, and it should rely on open and transparent processes. Broad-based engagement provides public officials with the opportunity to obtain information that often is widely dispersed across the economy.[4]

At the outset of engagement, the Federal Government should:

- Clearly identify the standards-based challenges it is encountering in addressing a national priority;
- Define its goals as precisely as possible;
- Provide a reasoned analysis of what has led to the perceived standards gap and what needs to be done to close it (including any relevant and appropriate science-based data); and,
- Commit, to the extent feasible and appropriate, to support the technical work necessary to achieve the defined goals.

[4] http://www.whitehouse.gov/the_press_office/TransparencyandOpenGovernment/.

Federal Government engagement in standards activities should be guided by five fundamental strategic objectives:

- Produce timely, effective standards and efficient conformity assessment schemes that are essential to addressing an identified need;
- Achieve cost-efficient, timely, and effective solutions to legitimate regulatory, procurement, and policy objectives;
- Promote standards and standardization systems that promote and sustain innovation and foster competition;
- Enhance U.S. growth and competitiveness and ensure non-discrimination, consistent with international obligations; and
- Facilitate international trade and avoid the creation of unnecessary obstacles to trade.

To realize these objectives, the Federal Government works with the private sector to address common standards-related needs, taking on a convening and/or active-engagement role where necessary to ensure a rapid, coherent response to national challenges. In undertaking such work, the Federal Government may play various roles in the standardization system – user, specifier, participant, facilitator, advocate, technical advisor/leader, convener, or source of funding – to assure that key public policy goals are achieved in a timely and effective manner. Successful achievement of these goals also requires an active effort to promote information sharing and coordination across the Federal Government.

When addressing national priorities, standardization activities should recognize the global nature of many markets. In the context of communications technologies, for example, both users and vendors realize enormous economies of scale when standards are globally developed and deployed. Users benefit from lower prices offered by vendors able to realize the economies of scale of a globally sized market. When diverse national standards are imposed, however, products must conform to diverse requirements for each national market, raising costs for government and private sector users, limiting the flexibility needed for efficiency and innovation, and reducing profitability.

Agency Responsibilities

Agencies considering a convening or active engagement role in private sector standards developing organizations in order to address a national priority area should state their reasons plainly (including why private sector leadership alone is insufficient). Further, agencies should accept and act on feedback on their rationales before assuming this convening or active-engagement role in a private sector standards developing organization. In all cases, agencies should ensure effective intra- and inter-agency coordination of engagement in standards development activities. When an agency commits to a cooperative standards development effort with industry, that commitment should be maintained, as resources permit, and the resulting standards should be used where feasible.

Agencies should use existing processes and, where necessary, establish new processes for open, transparent, and effective two-way communication with private sector interests, ensuring that concerns

from private sector entities are given thorough and objective consideration. To the extent feasible and appropriate, agencies should also provide continuous support for their technical experts' participation and leadership activities in mission-critical standards-setting activities and standards organizations, including standards organization-specific training and mentoring. Agencies should periodically review their standards activities to identify gaps in representation for mission-critical areas as part of their long-range planning and adopt policies that value and reward participation in standardization activities.

Agencies should explicitly include consideration of conformity assessment approaches that take account of elements from international systems, to encourage private sector support and minimize duplicative testing. Agencies should evaluate whether their objectives necessitate creating government-unique conformity assessment schemes, which may be expensive to develop and maintain, may impose additional costs on the private sector, and may not be recognized beyond national boundaries. In doing so, agencies should use existing best practices and leverage available resources in the private sector as well as within the Federal Government. Such expertise is available at the National Institute of Standards and Technology (NIST), which has statutory authority to coordinate conformity assessment activities of Federal, State and local governments, and the private sector.[5]

Both in national priority areas and more generally, agencies should take into account the impact of their standards-related choices on innovation and the global competitiveness of U.S. enterprises,[6] including the impact of intellectual property incorporated in standards, consistent with international obligations. On these matters, agencies should consult with USTR, which has statutory authority on international trade issues arising from standards and conformity assessment procedures.

OSTP, OMB, and USTR look forward to working cooperatively with you and your staff to promote engagement in standards activities that support national priorities.

[5] http://standards.gov/standards_gov/nttaa.cfm.

[6] Agencies should review OMB Circular A-119, section 6(f) for considerations regarding the use of a standard.

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September 27, 2012

Senator Tory Rocca, Chairperson
Senate Regulatory Reform Committee
P.O. Box 30036
Lansing, MI 48909-7536

RE: HB 4561

Dear Senate Regulatory Reform Committee:

My electrical career started in 1974 and one thing that has remained constant, is change. The technology changes in the electrical industry are continual and it is important to stay current with the codes as they change. As a former electrical inspector for the State of Michigan's Department of Labor and a Governor-appointed member to the State of Michigan Electrical Administrative Board, I can assert that delaying the adoption of nationally approved electrical and building safety codes would have a negative impact on the state's economy and more important the safety of it's citizens.

Michigan has adopted the 2008 Michigan Electrical Code that comprises of the 2008 edition of the National Electrical Code and the Michigan Administrative Rules. The 2008 Code is developed from proposals that had to be submitted in 2005. The electrical code requirements that are designed to enhance electrical safety and help us realize and take advantage of emerging technologies are codes put in place seven years ago. How can Michigan rejuvenate itself and its economy with code requirements that are more than six years behind the current technology?

The National Electrical Code, NEC, has been published since 1897 and is a working document. It was stated that there are only about a half dozen changes in the building code that are important. I serve on one of the National Electrical Code technical committees and there is a significant number of changes each cycle. Many of the changes have nothing to do with new technology and of course there are many changes regarding the newer technologies. The 2011 NEC, had over 5,000 proposals to address various concerns from the industry and public. There are books that are produced to address the major changes of the new code and are often limited to around 300 changes.

There are changes being made to the electrical vehicle industry that require new code updates to assist in the implementation and manufacturing of electrical vehicles by Michigan automakers. Our state has also seen a surge in green technologies with advancements in alternative energy opportunities like wind and solar power, but outdated code requirements make it difficult to make sure these new products are being used safely and realize their maximum benefit.

I have been in the electrical industry for 38 years and inspecting for the past 24 years. If we pass this legislation and have skipped a code cycle it would create problems. The inspectors and installers are required to have a code update class to keep up with the changes in order to renew their licenses. It would be extremely difficult for the education industry to keep track of two cycles to provide that type of a code update classes. The substitute language of the bill allows the use of new technology in a code that is not presently adopted. In order for the installer to utilize the new technology they would need to purchase the new codebooks in order to make a safe installation. The municipality would need to purchase the new codebooks even if it is not adopted in order to verify it was installed in a safe manner. The problem now occurs when an inspector is reviewing this new technology and discovers code violations, I believe the wording in the legislation does not allow they to site those violations. This is a major concern with the bill and concerns about not adopting the code when it is published.

The builders law requires them to purchase a code book in order to renew their license. The Electrical, Mechanical and Plumbing Codes do not have this requirement. The change in the builders law to require them to purchase a code book was recently added at the request of the same organization that is complaining about the cost of code books.

The codes we have contain a considerable amount of material to provide the required safety in the built environment. Though complete there are numerous other standards that coincide with these safety documents. It is necessary to have the other related standards to be included by reference. This bill appears to remove these reference documents. If this legislation is successful, the Michigan codes would need to substantially be increased in size to ensure safety is not compromised.

There have been numerous changes over the years that provide cost benefit by adopting the current code. The electrical industry has evolved over the past a few decades where the technology we are using for wiring methods has produced a considerable amount of cost savings. The rigid metal heavy walled raceways that were used underground have been replaced with PVC Conduit. A recent code cycle change has allowed the use of a new type of raceway underground, being HDPE, High Density Polyethylene Conduit. Costs have decreased with the technology changes in armor and metal clad cable applications. Contractors are using more cable assemblies than ever before. There have been changes in the code to allow some wiring methods that were prohibited above three floors and now permitted if concealed behind a rated wall or ceiling material. Fire alarm installations were

I passionately encourage you to vote **"no"** on moving this legislation out of committee.

Respectfully,

David Williams

David Williams, Secretary
Michigan Chapter IAEI

NEC® Cost Reduction Impact

In today's challenging economic times, both the public and private sector has been forced to look more closely at their processes and find innovative ways to streamline their operations. While change can be good, it's important not to lose sight of why forward thinking public officials should recognize the value of up-to date codes and process by which they are developed. Too often codes are the direct result of the aftermath of a catastrophic event. Unfortunately, HB 4561 takes a step to undermine that process and could put the public at risk. Proponents of the Bill continue to allege that new and revised provisions of the code increase the cost of construction. Additionally, they contend the majority of changes are editorial in nature. While editorial changes enhance the usability and understanding of the code, many of the changes are included to address new technologies, as well as enhanced safety provisions. In some cases these changes may add cost, but the enhanced safety for the public far outweighs that cost impact.

What proponents fail to recognize is there are changes in each code edition that also helps reduce the cost of construction. In some cases, these changes can have a very significant impact and failure to stay current will actually hurt the industry. The following examples help illustrate changes to the NEC® over the past few editions that have actually reduced the cost of construction.

- There have been changes in the code to reduce the energy calculations in the code that allows The 2011 NEC® permits these values to be significantly reduced when a device is employed that limits the current to the track. This change will provide a significant cost reduction for the mercantile sector, particularly in those cases where large linear installations of track are used to provide flexibility of lighting merchandise. The direct cost benefit will be the permitted use of smaller conductors, smaller conduit and smaller panelboards.
- Today, the majority of all business, as well as telecommunications systems, building controls, and mission critical operations run through Information Technology (IT) Equipment. The nature of IT, as well as the features of an IT equipment room, has changed dramatically since safety requirements were placed into the NEC® almost 50 years ago. Information technology equipment rooms are dynamic with its equipment often being changed, replaced or upgraded. The 2008 NEC® provides prescriptive requirements for sizing conductors, conduit and equipment. Consequently, this requires sizing of Feeder and Service load calculations be performed upon a single equipment snapshot in time and may not always provide an accurate calculation over the life of the installation. In addition, the diversity of the load based on the sum of the nameplate ratings may not provide an accurate representation of the actual load that occurs when this equipment is operated simultaneously. New Section 645.25 provides an alternative method for Feeder and Service sizing based on calculations performed by qualified persons under engineering supervision. This new provision for calculating data center loads is another example of where cost savings are a direct result, as the sizing of conductors, conduits and panelboards can be reduced in size. An example where a community recognized the value of the most up-to-date code was near Arlington, VA, where a banking company proposed to

build a new banking center and requested the building to be built using the most current code because of the advantages the new code provided.

- The 2008 NEC® requires the minimum size for service entrance conductors to be not less than the sum of the noncontinuous loads plus 125 percent of continuous loads. A new exception was added to 230.42(A) permitting grounded service conductors to be sized at 100% (instead of 125%) for continuous loads. This provides cost savings particularly for large capacity service installations in which copper conductors are used.
- The electrical industry has evolved over the past a few decades where the technology we are using for wiring methods has produced a considerable amount of cost savings. The rigid metal heavy walled raceways that were used underground are now permitted to be installed with PVC Conduit. Not only is there a cost savings with material, the labor costs to install have reduced considerably.
- A recent code cycle change has allowed the use of a new type of raceway underground, being HDPE, High Density Polyethylene Conduit. This is a nonmetallic raceway that comes on a reel and is continuous. A few years ago, this type of product was not available. Consequently, installation of "PVC" raceways prior to this product were more labor intensive, as the contractor was typically limited to gluing 10 ft joints of pipe together, as opposed to pulling pipe off a reel.
- There have been changes in the code to allow ENT, Electrical Nonmetallic Tubing that was prohibited above three floors and now permitted if concealed behind a rated wall or ceiling material or if the building is sprinkled.
- Changes to installations of fire alarm systems have received changes where cost benefits are utilized by wiring methods prohibited in previous codes.